



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

77 WEST JACKSON BOULEVARD

CHICAGO, IL 60604-3590

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U.S. ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL CLASS I NON-HAZARDOUS MINOR PERMIT
MODIFICATION

Permit Number: IN-051-1I-0002

Facility Name: WDW #2

Pursuant to the Underground Injection Control regulations of the U.S. Environmental Protection Agency codified at Title 40 of the Code of Federal Regulations (40 CFR), Parts 124, 144, 146, and 147,

Duke Energy Indiana, Inc. of Plainfield, Indiana

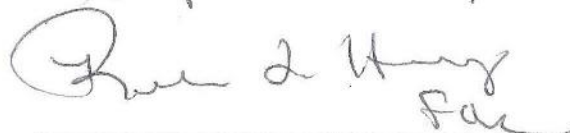
is hereby authorized to continue operation of an existing Class I non-hazardous injection well located in Indiana, Gibson County, T2S, R12W, Section 5, 1/4 Section NE, for injection into the Trenton Limestone, Black River Group, Ancell Group, the Knox Supergroup and the Potsdam Supergroup between depths of 5661 feet and 11720 feet below ground level upon the express condition that the permittee meet the restrictions set forth herein. The injection of any hazardous fluid as specified in 40 CFR Part 261 is prohibited.

All references to Title 40 of the Code of Federal Regulations (40 CFR) are to all regulations that are in effect on the date that this permit is effective. The following attachments are incorporated into this permit: A, B, C, D, E, F and G.

This permit is a minor modification of an existing permit, which was signed on December 1, 2005. This permit shall become effective on SEP 27 2012, and shall remain in full force and effect during the life of the permit, unless this permit is revoked, terminated, modified or reissued pursuant to 40 CFR 144.39, 144.40 or 144.41.

This permit and authorization to inject shall expire at midnight on December 1, 2015, unless terminated prior to the expiration date.

Signed and Dated: September 27, 2012



Tinka G. Hyde
Director, Water Division

This permit contains 16 pages and attachments A through G.

PART I
GENERAL PERMIT REQUIREMENTS

A. EFFECT OF PERMIT

The permittee is allowed to engage in underground injection in accordance with the conditions of this permit. Notwithstanding any other provisions of this permit, the permittee authorized by this permit shall not construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of injection, annulus or formation fluids into underground sources of drinking water (USDWs). The objective of this permit is to prevent the introduction of contaminants into USDWs if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR Part 141 or may otherwise adversely affect the health of persons. Any underground injection activity not specifically authorized in this permit is prohibited. For purposes of enforcement, compliance with this permit during its term constitutes compliance, with Part C of the Safe Drinking Water Act (SDWA). Such compliance does not constitute a defense to any action brought under Section 1431 of the SDWA, or any other common or statutory law other than Part C of the SDWA. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local law or regulations. Nothing in this permit shall be construed to relieve the permittee of any duties under applicable regulations.

B. PERMIT ACTIONS

1. Modification, Revocation, Reissuance and Termination - The Director of the Water Division of the United States Environmental Protection Agency (USEPA), hereinafter, the Director, may, for cause or upon request from the permittee, modify, revoke and reissue, or terminate this permit in accordance with 40 CFR 144.12, 144.39, and 144.40. Also, the permit is subject to minor modifications for cause as specified in 40 CFR 144.41. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes, or anticipated noncompliance on the part of the permittee does not stay the applicability or enforceability of any permit condition.
2. Transfer of Permits - This permit is not transferable to any person except in accordance with 40 CFR 144.38.

C. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

D. CONFIDENTIALITY

In accordance with 40 CFR Part 2 and Section 144.5, any information submitted to the USEPA pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, the USEPA may make the information available to the public without further notice. If a claim is asserted, the validity

of the claim will be assessed in accordance with the procedures in 40 CFR Part 2 (Public Information). Claims of confidentiality for the following information will be denied:

1. The name and address of the permittee; and
2. Information that deals with the existence, absence or level of contaminants in drinking water.

E. DUTIES AND REQUIREMENTS

1. Duty to Comply - The permittee shall comply with all applicable Underground Injection Control (UIC) Program regulations and conditions of this permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit issued in accordance with 40 CFR 144.34. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application.
2. Penalties for Violations of Permit Conditions - Any person who violates a permit requirement is subject to civil penalties, fines and other enforcement action under the SDWA. Any person who willfully violates permit conditions may be subject to criminal prosecution.
3. Continuation of Expiring Permits
 - (a) Duty to Reapply - If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must submit a complete application for a new permit at least sixty calendar days before this permit expires.
 - (b) Permit Extensions - The conditions of an expired permit may continue in force in accordance with 5 U.S.C. 558(c) and 40 CFR 144.37.
 - (c) Effect - Permits continued under 5 U.S.C. 558(c) and 40 CFR 144.37 remain fully effective and enforceable.
 - (d) Enforcement - When the permittee is not in compliance with the conditions of the expiring or expired permit, the Director may choose to do any or all of the following:
 - (1) Initiate enforcement action based upon the permit which has been continued;
 - (2) Issue a notice of intent to deny the new permit in which case, the owner or operator would then be required to cease the activities authorized by the continued permit or be subject to enforcement action for operation without a permit;
 - (3) Issue a new permit under 40 CFR Part 124 with appropriate conditions; or
 - (4) Take other actions authorized by the UIC regulations.
 - (e) State Continuation - A USEPA-issued permit does not continue in force beyond its expiration date under Federal law if at that time a State has primary enforcement

responsibility under the SDWA. A State authorized to administer the UIC program may continue either USEPA or State-issued permits until the effective date of the new permits, if State law allows. Otherwise, the facility or activity is operating without a permit from the time of expiration of the old permit to the effective date of the State-issued new permit. Furthermore, if the State does not continue the USEPA permit upon obtaining primary enforcement responsibility, the permittee must obtain a new State permit or be authorized to inject by State rule. Failure to do so while continuing to operate the well constitutes unauthorized injection and is a violation subject to enforcement action.

4. Need to Halt or Reduce Activity Not a Defense - It shall not be a defense for the permittee in an enforcement action to claim that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
5. Duty to Mitigate - The permittee shall take all timely and reasonable steps necessary to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.
6. Proper Operation and Maintenance - The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control and related appurtenances which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this permit.
7. Duty to Provide Information - The permittee shall furnish to the Director, within a time specified, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.
8. Inspection and Entry - The permittee shall allow the Director or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:
 - (a) Enter, at reasonable times, upon the permittee's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this permit;
 - (b) Have access to and copy, at reasonable times, any records that are kept under the conditions of this permit;
 - (c) Inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

- (d) Sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the SDWA, any substances or parameters at any facilities, equipment or operations regulated or required under this permit.

9. Records

- (a) The permittee shall retain records and all monitoring information, including all calibration and maintenance records and all original chart recordings for continuous monitoring instrumentation and copies of all reports required by this permit for a period of at least five (5) years from the date of the sample, measurement or report, unless these materials are submitted to the Director as part of reporting requirements under this permit.
- (b) The permittee shall maintain records of all data required to complete the permit application form for this permit and any supplemental information submitted under 40 CFR 144.27, 144.28, and 144.31 for a period of at least five (5) years from the date the permit application was signed.
- (c) The permittee shall retain records concerning the nature and composition of all injected fluids until three (3) years after the completion of plugging and abandonment of this injection well.
- (d) The retention period specified in Part I(E)(9)(a) through (c) of this permit may be extended by request of the Director at any time. The permittee shall continue to retain records after the retention period specified in Part I(E)(9)(a) through (c) of this permit or any requested extension thereof expires unless the permittee delivers the records to the Director or obtains written approval from the Director to discard the records.
- (e) Records of monitoring information shall include:
 - (1) The date, exact place, and time of sampling or measurements;
 - (2) The name(s) of individual(s) who performed the sampling or measurements;
 - (3) A precise description of both sampling methodology and the handling of samples;
 - (4) The date(s) analyses were performed;
 - (5) The name(s) of individual(s) who performed the analyses;
 - (6) The analytical techniques or methods used; and
 - (7) The results of such analyses.

10. Monitoring - Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The permittee shall use the methods described in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" (available

from Solid Waste Information, USEPA, 26 W. St. Claire St., Cincinnati, Ohio 45268), or equivalent methods approved by the Director, to take representative samples. Monitoring results shall be reported at the intervals contained in Part II(D)(1) through (3) and Part III(A) of this permit.

- (a) Monitoring of the nature of injected fluids shall comply with applicable analytical methods cited and described in Table I of 40 CFR 136.3 or in certain circumstances by other methods that have been approved by the Director.
 - (b) Sampling and analysis shall comply with the specifications of the Waste Analysis Plan required in Part II(C)(3) of this permit.
11. Signatory Requirements - All reports or other information, required to be submitted by this permit or requested by the Director shall be signed and certified in accordance with 40 CFR 144.32.
12. Reporting Requirements
- (a) Planned Changes - The permittee shall give written notice to the Director, as soon as possible, of any planned physical alterations or additions to the permitted facility other than minor repair/replacement maintenance activities.
 - (b) Anticipated Noncompliance - The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity, which may result in noncompliance with permit requirements.
 - (c) Compliance Schedules - Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted by the permittee no later than thirty calendar days following each schedule date.
 - (d) Twenty-four Hour Reporting
 - (1) The permittee shall report to the Director any permit noncompliance, which may endanger human health or the environment. See, e.g., Part I(G)(5) of this permit. Any information shall be provided orally within twenty-four hours from the time the permittee becomes aware of the circumstances. Such reports shall include, but not be limited to the following information:
 - (i) Any monitoring or other information which indicates that any contaminant may cause an endangerment to a USDW; and
 - (ii) Any noncompliance with a permit condition, or malfunction of the injection system, which may cause fluid migration into or between USDWs; and
 - (iii) Any failure to maintain mechanical integrity.

- (2) A written submission shall also be provided within five working days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and, if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate and prevent recurrence of the noncompliance.
- (e) Other Noncompliance - The permittee shall report all other instances of noncompliance not otherwise reported at the time monitoring reports are submitted. The reports shall contain the information listed in Part I(E)(12)(d)(2) of this permit.
- (f) Other Information - When the permittee becomes aware of failure to submit any relevant facts in the permit application or that incorrect information was submitted in a permit application or in any report to the Director, the permittee shall submit such facts or corrected information within ten calendar days.
- (g) Report on Permit Review - Within thirty calendar days of receipt of this permit, the permittee shall certify to the Director that he or she has read and is personally familiar with all terms and conditions of this permit.

F. PLUGGING AND ABANDONMENT

1. Notice of Plugging and Abandonment - The permittee shall notify the Director at least sixty calendar days before conversion or abandonment of the well. At the discretion of the Director, a shorter notice period may be allowed.
2. Plugging and Abandonment - The permittee must receive the approval of the Director before plugging the well and shall plug and abandon the well consistent with 40 CFR 144.52(a)(6) and 146.10, as provided for in the Plugging and Abandonment Plan contained in Part III(B) of this permit. Within sixty calendar days after plugging a well, the permittee shall submit a Plugging and Abandonment report to the Director. The report shall be certified as accurate by the permittee and by the person who performed the plugging operation (if other than the permittee), and shall consist of either:
 - (a) A statement that the well was plugged in accordance with the Plugging and Abandonment Plan previously approved by the Director; or
 - (b) If the actual plugging differed from the approved plan, a statement defining the actual plugging and explaining why the Director should approve such deviation. If the Director determines that a deviation from a previously approved plan may endanger underground sources of drinking water, the permittee shall replug the well as required by the Director.
3. Temporary Abandonment - If the permittee ceases injection into the well for more than twenty-four (24) consecutive months, the well is considered to be in temporary abandoned status, and the permittee shall plug and abandon the well in accordance with the approved

plan and 40 CFR 144.52 (a)(6), or make another demonstration of non-endangerment (e.g., a standard annulus pressure test). During any periods of temporary abandonment or disuse, the well will be tested to ensure that it maintains mechanical integrity. Demonstrations of non-endangerment/testing will be due every two years from the last successful test (unless the permit requires more frequent demonstrations of mechanical integrity). If the well loses mechanical integrity prior to the next test due date, then the well must either be plugged or repaired and retested within thirty days of losing mechanical integrity. The permittee shall continue to comply with the conditions of this permit, including all monitoring and reporting requirements according to the frequencies outlined in the permit.

4. Revision of Plugging and Abandonment Plan - If the permittee finds it necessary to change a Plugging and Abandonment Plan, a revised plan shall be submitted to the Director for approval at the time of the next monthly report.
5. Standards for Well Closure - Prior to plugging and abandoning the well:
 - (a) The permittee shall observe and record the pressure decay for a time specified by the Director and shall report this information to the Director.
 - (b) The permittee shall conduct appropriate mechanical integrity testing to ensure the integrity of that portion of the long string casing and cement that
 - (1) Pressure tests with liquid;
 - (2) Noise, temperature, pipe evaluation, or cement bond logs; or
 - (3) Any other test required by the Director.
 - (c) Prior to well closure, the well shall be flushed with a buffer fluid.

G. MECHANICAL INTEGRITY

1. Standards - The injection well must have and maintain mechanical integrity consistent with 40 CFR 146.8(a)(1) and (2). Mechanical integrity demonstrations must be witnessed by an authorized representative of the Director.
2. Periodic Mechanical Integrity Testing [Section 146.8] - The permittee shall conduct the mechanical integrity testing as follows:
 - (a) Long string casing, injection tubing and annular seal shall be tested by means of an approved pressure test in accordance with 40 CFR 146.8(b)(2). This test shall be performed upon completion of this well, and at least once every twelfth month beginning with the date of the last approved demonstration and whenever there has been a well workover in which tubing is removed from the well, the packer is reset, or when loss of mechanical integrity becomes suspected during operation;
 - (b) An approved temperature, noise, oxygen activation, or other approved log shall be run upon completion of this well and at least once every sixty (60) months from the date

of the last approved demonstration to test for movement of fluid along the bore hole. The Director may require such tests whenever the well is worked over. The permittee must submit logging procedures to the Director for approval before running logs for the purpose of meeting this requirement.

- (c) The permittee may request the Director to use any other test approved by the Director in accordance with the procedures in 146.8(d).
- 3. Prior Notice and Reporting - The permittee shall notify the Director of his or her intent to demonstrate mechanical integrity at least thirty calendar days prior to such demonstration. At the discretion of the Director a shorter time period may be allowed. Reports of mechanical integrity demonstrations which include logs must include an interpretation of results by a knowledgeable log analyst. The permittee shall report the results of a mechanical integrity demonstration within forty-five calendar days after completion thereof.
- 4. Gauges - The permittee shall calibrate all gauges used in mechanical integrity demonstrations to an accuracy of not less than one-half percent of full scale, prior to each required test of mechanical integrity. A copy of the calibration certificate shall be submitted to the Director or his or her representative at the time of demonstration and every time the gauge is calibrated. The gauge shall be marked in no greater than five psi increments.
- 5. Loss of Mechanical Integrity - If the permittee or the Director finds that the well fails to demonstrate mechanical integrity during a test, or fails to maintain mechanical integrity during operation, or that a loss of mechanical integrity as defined by 40 CFR 146.8(a)(1) and (2) is suspected during operation, the permittee shall halt the operation immediately and follow the reporting requirements as directed in Part I(E)(12) of this permit. The permittee shall not resume operation until mechanical integrity is demonstrated and the Director gives approval to recommence injection.
- 6. Mechanical Integrity Testing on Request From Director - The permittee shall demonstrate mechanical integrity at any time upon written notice from the Director.

H. FINANCIAL RESPONSIBILITY

- 1. Financial Responsibility - The permittee shall maintain financial responsibility and resources to close, plug, and abandon the underground injection operation in a manner consistent with 40 CFR 144.52(a)(7). The approved financial assurance mechanism is found in Part III(C) of this permit.
 - (a) The permittee must maintain a written cost estimate, in current dollars, for the Plugging and Abandonment Plan as specified in 40 CFR 146.10. The plugging and abandonment cost estimate at any point in the life of the facility operation must equal the maximum cost of plugging and abandonment at that time.
 - (b) The permittee must adjust the cost estimate of plugging and abandonment for inflation within thirty calendar days after each anniversary of the first estimate. The inflation factor is the result of dividing the latest published annual Oil and Gas Field Equipment Cost Index by the index for the previous year.

- (c) The permittee must revise the plugging and abandonment cost estimate whenever a change in the Plugging and Abandonment Plan increases the cost of plugging and abandonment.
 - (d) If the revised plugging and abandonment estimate exceeds the current amount of the financial assurance mechanism, the permittee shall submit a revised mechanism to cover the increased cost within thirty calendar days after the revision specified in Part I(H)(1)(b) and (c) of this permit.
 - (e) The permittee must keep on file at the facility a copy of the latest plugging and abandonment cost estimate prepared in accordance with 40 CFR 144.52(a)(7), during the operating life of the facility.
2. Insolvency - The permittee must notify the Director within ten business days of any of the following events:
- (a) The bankruptcy of the trustee or issuing institution of the financial mechanism; or
 - (b) Suspension or revocation of the authority of the trustee institution to act as trustee; or
 - (c) The institution issuing the financial mechanism losing its authority to issue such an instrument.
3. Notification - The permittee must notify the Director by certified mail of the commencement of voluntary or involuntary proceedings under Title 11 (Bankruptcy), U.S. Code naming the owner or operator as debtor, within ten business days after the commencement of the proceeding. A guarantor of a corporate guarantee must make such a notification if he or she is named as debtor, as required under the terms of the guarantee.
4. Establishing Other Coverage - The owner or operator must establish other financial assurance or liability coverage acceptable to the Director, within sixty calendar days of the occurrence of the events in Part I(H)(2) or (H)(3) of this permit.

I. CORRECTIVE ACTION

- 1. Compliance - The permittee shall comply with 40 CFR 144.55 and 146.7.
- 2. Corrective Action Plan - The permittee shall file a Corrective Action Plan for approval by the Director within thirty days of a written determination by the Director that improperly plugged, completed, or abandoned wells, or wells for which plugging or completion information is unavailable, are present in the area of review and penetrate the confining zone of the permitted well, as defined in the administrative record for this permit.
- 3. Prohibition of Movement of Fluids into USDWs [Section 144.12] Should upward migration of fluids through the confining zone of this permitted well be discovered within the two mile area of review due to injection activities at this facility, and should this migration of fluids cause the introduction of any contaminant into a USDW pursuant to 40 CFR 144.12, the

permittee shall immediately cease injection into this well until the situation has been corrected and reauthorization to inject has been given by the Director.

J. COMMENCING INJECTION

The permittee may not commence injection until:

1. Results of the formation testing and logging program as specified in the administrative record of this permit are submitted to and approved by the Director; and
2. Mechanical integrity of the well has been demonstrated in accordance with 40 CFR 146.8(a)(1) and (2) and in accordance with Part I(G)(1) through (3) of this permit; and
3. Results from ambient monitoring as required in Part II(C)(4) of this permit have been submitted and approved by the Director; and
4. All required corrective action has been taken in accordance with 40 CFR 144.55 (b)(2); and
5. Written authorization to commence injection has been granted by the Director.

PART II
WELL SPECIFIC CONDITIONS FOR UIC PERMITS

A. CONSTRUCTION

1. Siting [Section146.12(a)] - The injection well shall inject only into the formation at the depths listed on the cover page of this permit. At no time shall injection occur into a formation which is or is above the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water.
2. Casing and Cementing [Section146.12(b)] - Notwithstanding any other provisions of this permit, the permittee shall case and cement the well in such a manner so as to prevent the movement of fluids into or between USDWs for the expected life of the well. The casing and cement used in the construction of this well are shown in Part III(E) of this permit and in the administrative record for this permit. Any change shall be submitted for approval by the Director before installation.
3. Tubing and Packer Specifications [Section146.12(c)] - The permittee shall inject only through tubing with a packer set within the long string casing at a point within or below the confining zone. The tubing and packer used in the well are represented in engineering drawings contained in Part III(E) of this permit. Any changes shall be submitted by the permittee for the approval of the Director before installation.
4. Wellhead Specification [Section144.51(i)(4)] - The permittee shall install and maintain a female coupling and valve on the wellhead, to be used for independent injection pressure readings. Further, the permittee shall install a sampling port for waste sampling consistent with the permittee's waste sampling procedures, if applicable.

B. OPERATIONS [Section146.13]

1. Injection Pressure Limitation - Except during stimulation, the permittee shall not cause or permit the injection pressure at the wellhead to exceed the maximum limitation which is specified in Part III(A) of this permit. In no case shall injection pressure initiate fractures or propagate existing fractures in the confining zone or cause the movement of injection or formation fluids into a USDW. The instantaneous maximum surface pressure limit specified in Part III(A) of this permit shall be adjusted as the instantaneous injection fluid specific gravity varies in accordance with the calculation set forth in Part III(A).
2. Additional Injection Limitation - No waste streams other than those identified in Part III(F) of this permit shall be injected. Every twelfth month the permittee shall submit a certified statement attesting to compliance with this requirement.
3. Annulus Fluid and Pressure - The permittee shall fill the annulus between the tubing and the long string casing with a fluid approved by the Director and identified in the administrative record of this permit. Any change in the annulus fluid, except during workovers or times of annulus maintenance, shall be submitted by the permittee for the approval of the Director

before replacement. Except during workovers, the permittee shall maintain a positive pressure on the annulus as specified in Part III(A) of this permit.

4. Annulus/Tubing Pressure Differential - Except during workovers or times of annulus maintenance, the permittee shall maintain, over the entire length of the tubing, a pressure differential between the tubing and annulus as specified in Part III(A) of this permit.
5. Automatic Warning and Automatic Shut-off System - The permittee shall continuously operate and maintain an automatic warning and automatic shut-off system to stop injection in any of the following situations:
 - (a) Pressure changes in the annulus or annulus/tubing differential signifying or identifying possible deficiencies in mechanical integrity; or
 - (b) Injection pressure, annulus pressure, or annulus/tubing differential pressure reaches the pressure limits as specified in Part III(A) of this permit.

Whenever the maximum surface pressure limit is adjusted in accordance with the calculation set forth in Part III(A), alarm and shut-down pressures must be adjusted to the same extent. A trained operator must be on site and within perceptible distance of the alarm at all times when the well is operating. The permittee must test the automatic warning and automatic shut-off system at least every twelfth month. This test must involve subjecting the system to simulated failure conditions and must be witnessed by the Director or his or her representative.

6. Precautions to Prevent Well Blowouts [Section 144.51(e) and Section 144.52(a)(9) and (b)(1)] – In order to prevent the migration of fluids into underground sources of drinking water, the permittee shall maintain on the well at all times a pressure which will prevent the return of the injection fluid to the surface. The well bore must be filled with a high specific gravity fluid during workovers to maintain a positive (downward) gradient and/or a plug shall be installed which can resist the pressure differential. A blowout preventer must be kept in proper operational status during workovers. In cases where the injected wastes have the potential to react with the injection formation to generate gases, the permittee shall follow the procedures below to assure that a backflow or blowout does not occur:
 - (1) Limit the temperature, pH or acidity of the injected waste; and
 - (2) Develop procedures necessary to assure that pressure imbalances do not occur.

C. MONITORING

1. Sampling Point - The injection fluid samples shall be taken at the sampling location as specified in Part III(A) of this permit.
2. Continuous Monitoring Devices - The permittee shall maintain continuous monitoring devices and use them to monitor injection pressure, flow rate, the pressure on the annulus between the tubing and the long string of casing and specific gravity. If the well is equipped with a fluid level indicator, the permittee shall monitor the fluid level daily. The monitoring results shall

be submitted to the Director as specified in Part II(D) of this permit. The permittee shall maintain for USEPA's inspection at the facility an appropriately scaled, continuous analog record of these monitoring results as well as original copies of any digitally recorded information pertaining to these operations.

3. Waste Analysis Plan [Section144.52(a)(5)] - The permittee shall comply with the written Waste Analysis Plan which describes the procedures used to monitor the nature of injected fluids and the procedures which will be carried out to comply with Part (I)(E)(10) of permit. A copy of the approved plan shall also be kept at the facility.
4. Ambient Monitoring [Section146.13(d)(1)]
The permittee shall monitor the pressure buildup in the injection zone initially upon completion of the well, and at least once every twelfth month thereafter, including at a minimum, a shut down of the well for a time sufficient to conduct a valid observation of the pressure fall-off curve. From this observation, the permittee shall submit a report including at least a calculation of pressure build-up in the injection zone, injection zone transmissivity, and well bore skin factor. If the permittee chooses, the ambient monitoring may be performed on only one of the wells at the facility during each twelfth month monitor event. In this case, the permittee shall alternate the twelve month testing among the wells on site.

D. REPORTING REQUIREMENTS [Section146.13(c)]

The permittee shall submit all required reports to the Director at:

U.S Environmental Protection Agency
77 West Jackson Boulevard (WU-16J)
Chicago, Illinois 60604-3590
ATTN: UIC Branch, Direct Implementation

1. Monthly Reports - The permittee shall submit monthly reports of the following information no later than the end of the month following the reporting period:
 - (a) Waste analysis results per the approved waste analysis plan as applicable. Laboratory reports must be submitted with the first monthly monitoring report following their receipt by the operator. This report must include statements showing that the requirements of Part I(E)(10) and Part II(C)(3) have been met;
 - (b) A tabulation of maximum injection pressure, a daily measurement of annulus tank fluid level, and minimum differential between simultaneous measurements of injection pressure and annulus pressure for each day of the month;
 - (c) Appropriately scaled graphs showing
 - (1) At a minimum, daily maximum injection pressure, daily average flow rate and daily minimum annulus/longstring casing pressure differential on a single, monthly chart.

- (2) At a minimum, instantaneous injection fluid specific gravity, instantaneous maximum injection pressure calculated as specified in Part III(A) and actual injection pressure.
 - (d) A statement of the total volumes of the fluid injected to date, in the current calendar year, and the current month;
 - (e) A tabulation of the dates, amounts and types of liquid added to or removed from the annulus system during the month, and the cumulative additions and cumulative subtractions for the current month and each of the past 12 months;
 - (f) Any noncompliance with conditions of this permit, including but not limited to: any event that exceeds operating parameters for annulus pressure or injection pressure or annulus/tubing differential as specified in the permit; or
 - (g) Any event which triggers an alarm or shutdown device required in Part II(B)(5) of this permit.
2. Annual Reports - The permittee shall report the following at least every twelfth month:
- (a) Results of the injection fluid analyses specified in the approved waste analysis plan as recorded in the administrative record for this permit as applicable. This report must include statements showing that the requirements of Part I(E)(10) and Part II(C)(3) have been met;
 - (b) Results of ambient monitoring required by 40 CFR 146.13(d)(1) and Part II(C)(4) of this permit; and
 - (c) A certified statement attesting that no waste streams other than those identified in Part II(B)(2) of this permit were injected into the well.
3. Reports on Well Tests and Workovers - Within forty-five calendar days after the activity, the permittee shall report to the Director the results of demonstrations of mechanical integrity, any well workover, and/or results of other tests required by this permit

PART III
ATTACHMENTS

These attachments include, but are not limited to, permit conditions and plans concerning operating procedures, monitoring and reporting, as required by 40 CFR Parts 144 and 146. The permittee shall comply with these conditions and adhere to these plans as approved by the Director, as follows:

- (A) SUMMARY OF OPERATING, MONITORING AND REPORTING REQUIREMENTS
- (B) PLUGGING AND ABANDONMENT PLAN
- (C) FINANCIAL ASSURANCE MECHANISM
- (D) CONTINGENT CORRECTIVE ACTION
- (E) CONSTRUCTION DETAILS
- (F) SOURCE AND ANALYSIS OF WASTE
- (G) SPECIAL CONDITIONS RELATED TO REMOTE MONITORING

ATTACHMENT A
SUMMARY OF OPERATING, MONITORING AND REPORTING REQUIREMENTS

Characteristics	Limitation	Minimum Monitoring Frequency	Minimum Reporting Frequency
Injection Pressure	1714 psig*	continuous	monthly
Annulus Pressure	100 psig (minimum)	continuous	monthly
Annulus/Tubing Differential	100 psig (minimum) above operating injection pressure	continuous	monthly
Flow Rate	—	continuous	monthly
Sight Glass Level	—	daily	monthly
Cumulative Volume	—	continuous	monthly
Annulus Fluid Loss	—	monthly	monthly
Chemical Composition of Injected Fluids	—	monthly	monthly
Physical Characteristics of Injected Fluids	—	monthly	monthly
Specific Gravity	1.0 (minimum)	continuous	monthly

Sampling Location: At the source of generation. A manual spigot located on the wastewater main discharge line of the final filtration unit prior to the wellhead.

* The limitation on injection pressure will serve to prevent injection-formation fracturing. This limitation is based on a calculation of the fracture pressure in the St. Peter Sandstone, the formation in the wellbore with lowest fracture pressure. This was documented in a report submitted by Duke Energy, entitled "Maximum Allowable Surface Injection Pressure Determinations WDW No. 1 and WDW No. 3", dated December 17, 2008. This document is part of the administrative record for this permit. The calculated fracture pressure in the St. Peter Sandstone is 4594.5 psi-absolute (psia). The instantaneous maximum allowable surface injection pressure is based on this number and adjusted using the following formula:

$$\text{MIP} = 4594.5 \text{ psia} - (0.433515 \text{ psi/ft} \times \text{SG}) \times \text{D ft} - 14.7 \text{ psi}$$

where: MIP = instantaneous maximum surface injection pressure
0.433515 = pressure gradient of fresh water (psi/ft),
SG = instantaneous specific gravity of injected fluid,
D = depth below ground level to the zone with the lowest strength
14.7 = atmospheric pressure (to convert absolute pressure to gauge pressure, psig).

The value of 1714 psig was calculated using a specific gravity of 1.0 and a depth of 6608.8 ft below ground level.

**As specified in the Sampling and Analysis Plan, found in the administrative record for this permit. At a minimum, this analysis shall include, but not be limited to, the following: Temperature, pH and Specific Gravity.

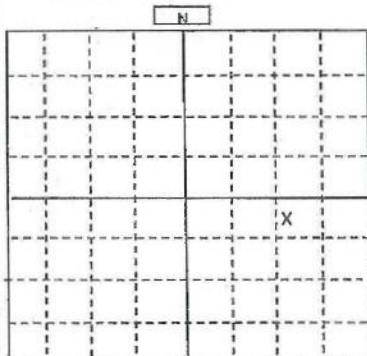
OMB No. 2040-0042 Approval Expires 1/31/05

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460**PLUGGING AND ABANDONMENT PLAN**

Name and Address of Facility

Duke Energy, Gibson Station
1097 N. 950 W.; Owensville, Indiana 47665

Name and Address of Owner/Operator

Duke Energy Indiana, Inc.
1000 East Main St.; Plainfield, Indiana 46168Locate Well and Outline Unit on
Section Plat - 640 Acres

State

Indiana

County

Gibson

Permit Number

IN-051-11-0002

Surface Location Description

1/4 of NW 1/4 of NE 1/4 of SE 1/4 of Section 5 Township 2S Range 12W

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface

Location 500 ft. From (N/S) N Line of Quarter Section

And 1130 ft. From (E/W) E Line of Quarter Section

TYPE OF AUTHORIZATION

☒ Individual Permit☐ Area Permit☐ Rule

Number of Wells 1

Lease Name IN-051-11-0002

WELL

☒ Class I☐ Hazardous☒ Nonhazardous☐ Class II☐ Brine Disposal☐ Enhanced Recovery☐ Hydrocarbon Storage☐ Class III

ACTIVITY

Well Number WDW No. 2

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
13 3/8"	61		523	17 1/2
9 5/8"	36/40		7,424	12 1/4
7"	26		4,098	8 1/2

METHOD OF EMPLACEMENT OF CEMENT PLUGS

☒ Balance Method☐ Dump Bailer Method☐ Two Plug Method☐ Other

CEMENT TO PLUG AND ABANDON DATA:

	Plug #1	Plug #2	Plug #3	Plug #4	Plug #5	Plug #6	Plug #7
Size of Hole or Pipe in Which Plug Will Be Placed (inches)	8 1/2/ 7	7	7	7	7	9 5/8	9 5/8
Depth to Bottom of Tubing or Drill Pipe (ft)	11,724'	11,098'	10,800'	8,130'	7,920'	7,000'	6,000'
Sacks of Cement To Be Used (each plug)	255	64	535	46	185	405	2428
Slurry Volume To Be Pumped (cu. ft.)	301	71	631	54	218	478	2865
Calculated Top of Plug (ft.)	11,098'	10,800'	8,130'	7,920'	7,000'	6,000'	0
Measured Top of Plug (if tagged, ft.)	NA	NA	NA	NA	NA	NA	NA
Slurry Weight (Lb./Gal.)	15.6	15.6	15.6	15.6	15.6	15.6	15.6
Type of Cement or Other Material (Class III)	H	H	H	H	H	H	A

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
SEE DATA FROM SHEET TWO			

Estimated Cost to Plug Wells

Cement - \$160,000; Logging - \$40,000; Rig - \$80,000; Rental Tools - \$30,000; Site Work - \$10,000; Miscellaneous - \$50,000

Total - \$370,000

CERTIFICATION

I certify under the penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref.40 CFR 144.32)

Name and Official Title (Please type or print)
John B. Hayes
Vice President, Gibson Generating Station
EPA Form 7520-14 (Rev. 8-01)

Signature
John B. Hayes

Date Signed
2-13-2012

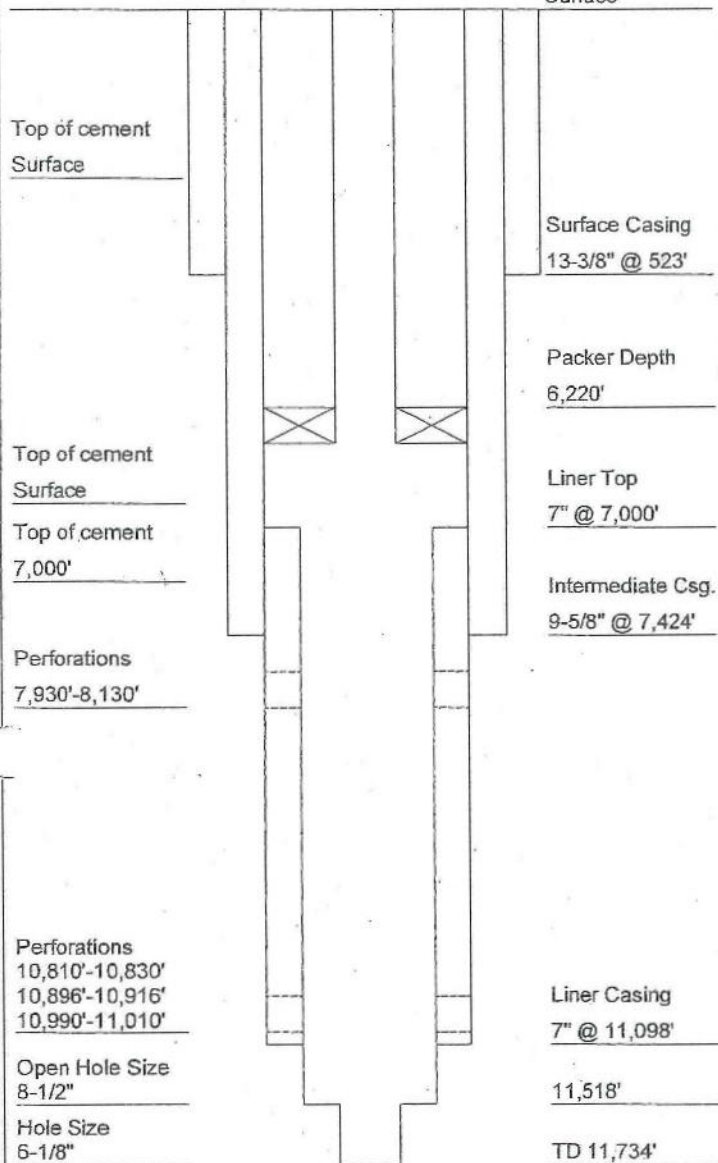
ORIGINAL WELL CONSTRUCTION DURING OPERATION

PLUGGING AND ABANDONMENT CONSTRUCTION

GIBSON GENERATING STATION
WDW #2
OWENSVILLE, INDIANA

IN-051-1I-0002
Page B-2 of 2

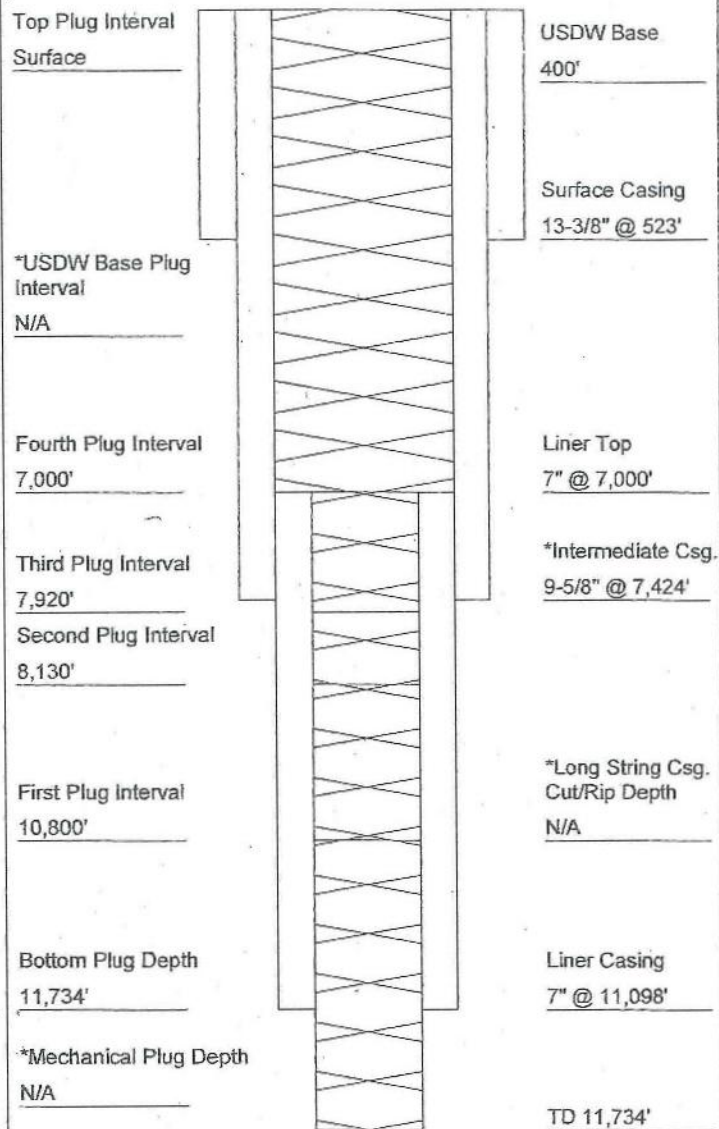
Surface



** Add any additional information

* May not apply

Surface



** Add any additional information

* May not apply

LIST OF ALL OPEN AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED

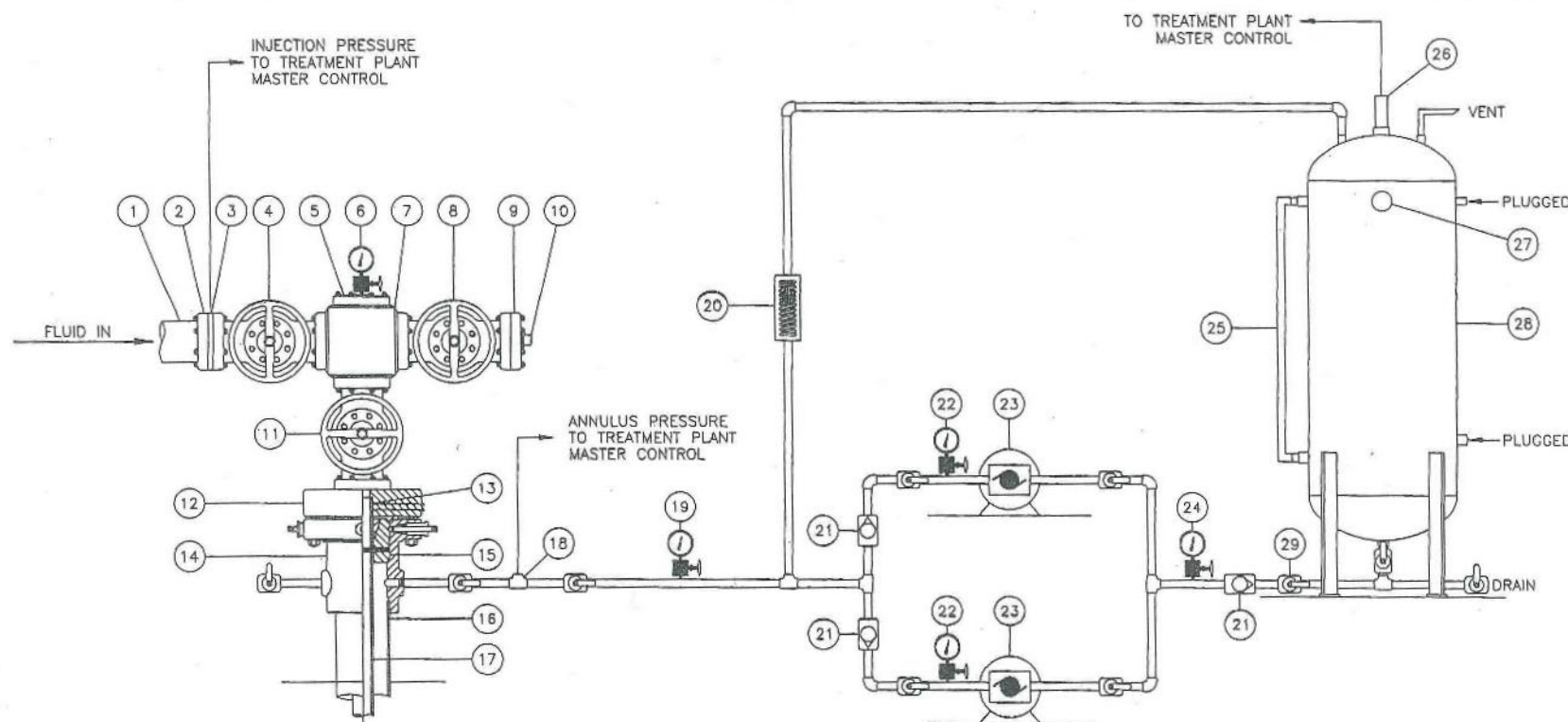
Specify Open Hole/Perforations/Varied Casing	From	To	Formation Name
Open hole, perforations / 7" casing	11,734'	10,800'	Mt. Simon, Eau Claire
7" casing / perforations	10,800'	8,130'	Oneota / Eminence / Potosi / Franconia / Davis / Eau Claire
7" casing / perforations	8,130'	7,920'	Oneota / Prairie du Chein
7" casing	7,920'	7,000'	Prairie du Chein
9-5/8" casing	7,000'	Surface	(See stratigraphy schematic)

ATTACHMENT C
FINANCIAL ASSURANCE MECHANISM

Duke Energy Indiana, Inc. has demonstrated adequate financial responsibility to properly plug and abandon their Class I non-hazardous wells. If Financial Statement Coverage is used as the financial mechanism to cover the cost of plugging the injection wells, this coverage must be updated on an annual basis.

ATTACHMENT D
CONTINGENT CORRECTIVE ACTION

No corrective action is required at this time. In the event that a well which penetrates the confining zone and does not have mechanical integrity, is discovered within the Area of Review, Duke Energy Indiana, Inc. will notify the United States Environmental Protection Agency (USEPA) of the discovery immediately and will take action to ensure that no Underground Sources of Drinking Water are threatened. Should upward fluid migration be detected through the well bore of any previously unknown, improperly plugged, completed or abandoned well in the Area of Review due to injection of permitted fluid, injection will immediately cease and the USEPA will be notified as required in Part I (E) (12) (d) of this permit. A Corrective Action Plan shall then be submitted as required in Part I (I) (2) of this permit.



NOTE: All tubing, valves, fittings, and accessories to be rated at 3,000 psi working pressure

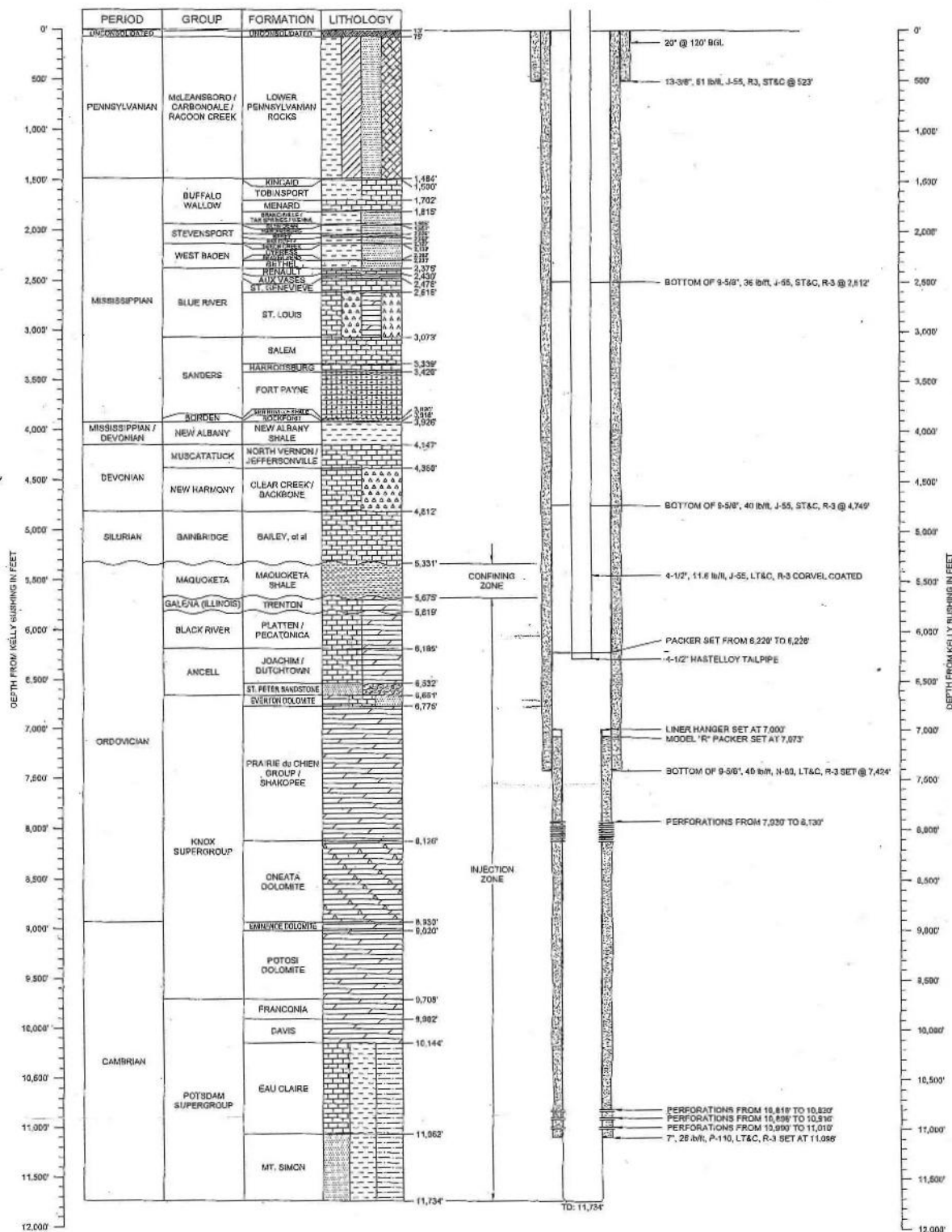
Underlined data for start-up purposes only

WELLHEAD AND ANNULUS PRESSURE MAINTENANCE SYSTEM DETAILS

1. Injection flow line, 4" O.D., yellow box fiberglass from Injection pumps
2. DSA, 4 $\frac{1}{2}$ " x 3,000 psi x 4" 900 RF
3. Injection pressure sensor (to treatment plant master control)
4. Injection wing valve, 4", full opening, 3,000 psi
5. Flange, 4 $\frac{1}{2}$ " x 3,000 psi x 2 $\frac{1}{2}$ " 8RD
6. Wellhead injection pressure gauge with block valve (0-3,000 psi)
7. Junction block
8. Secondary wing valve, 4", full opening, 3,000 psi
9. Flange, 4 $\frac{1}{2}$ " x 3,000 psi x 2" LPO
10. Plug, 2", 3,000 psi
11. Master valve, 4", full opening, 3,000 psi
12. Tubing bonnet, DSPOF, 11" x 4 $\frac{1}{2}$ " x 3,000 psi with two 7" I.D. P-seals, with TST ports
13. 4 $\frac{1}{2}$ " I.D. P-seals
14. Casing head, 9 $\frac{1}{2}$ " SOW x 11", 3,000 psi WP, C-22-L (2P) with 2" LPO
15. Casing hanger, automatic C-22, 11" x 4 $\frac{1}{2}$ "
16. Surface casing, 9 $\frac{1}{2}$ ", 36 & 40 lb/ft
17. 4 $\frac{1}{2}$ " injection tubing, plastic lined
18. Annulus pressure sensor to treatment plant master control, alarm and pump shut down at 2,800 psi
19. Annulus pressure gauge (0-3,000 psi) with block valve for test port
20. Adjustable relief valve set at 2,800 psi, back to tank
21. Check valve as required
22. Pump pressure gauge with block valve as required (0-3,000 psi)
23. Pressure pump, max. working pressure 3,000 psi, start on min. pressure 2,800 psi, stop on max. pressure 3,000 psi
24. Suction pressure gauge with block valve (0-3,000 psi)
25. Sight glass
26. Fluid level sensor to treatment plant master control (min. alarm 50 gallons)
27. Fill port
28. 200 gallon atmospheric steel tank filled with fresh water and 'Nalco' conditioner
29. Ball valve as required (typical)

NOT TO SCALE

		HOUSTON, TX.	
		SOUTH BEND, IN.	
		BATON ROUGE, LA.	
FIGURE IV-1			
DUKE ENERGY INDIANA, INC.			
GIBSON GENERATING STATION			
WDW #2 WELLHEAD AND ANNULUS PRESSURE MAINTENANCE SYSTEM DETAILS			
DATE: 2/27/08	CHECKED BY: JMS	JOB NO: 70G5937	
DRAWN BY: CRB	APPROVED BY: RWS	DWG. NO:	



Legend

	Anhydrite		Clay		Shale
	Chert		Dolomite		Siltstone
	Cherty Dolomite		Limestone		Unconsolidated
	Cherty Limestone		Quartzite		
	Coal		Sandstone		



HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

FIGURE VI-1
DUKE ENERGY INDIANA, INC.
GIBSON GENERATING STATION
AS-BUILT WDW #2 CONSTRUCTION
AND STRATIGRAPHY SCHEMATIC

DATE: 7/27/08 CHECKED BY: JMS JOB NO: 7005937
DRAWN BY: CRB APPROVED BY: RWS DWG. NO:

ATTACHMENT F
SOURCE AND ANALYSIS OF WASTE

Source of Waste and Limitation - The Duke Energy Indiana, Inc. wells are used primarily to dispose of Class I non-hazardous aqueous waste from on-site wet flue gas de-sulfurization units associated with coal-fired electrical power generating facility. Duke Energy Indiana, Inc. is also authorized to use this injection well to dispose non-hazardous waste excluded from management under the Resource Conservation and Recovery Act, as specified at 40 CFR Section 261.4, provided the requirement in Part A, regarding sampling and reporting have been met. The requirements of 40 CFR Section 146.13(b)(1) specify that any operator of a Class I underground injection control well monitor and analyze the fluids injected into the wells.

All other fluids entering this borehole for purposes of well testing, stimulation, workovers, or as buffer fluids must be approved by the Director.

Waste Analysis Plan - The approved Waste Analysis plan is entered into the administrative record for this permit and thus becomes an integral part of this permit.

ATTACHMENT G
REMOTE OPERATIONS

For the purpose of this permit, remote monitoring is defined as injection into the well when a trained operator is not present on site property and able to perceive shut-down alarms and able to physically respond to the well controls or the wellhead within 15 minutes of a compliance alarm condition.

1. Local operating system and remote monitoring system: If remote monitoring is to be used to operate the well, an operating system and programmable logic controller shall be on-site and shall have a back-up power supply and an automatic pager designed to alert designated on-call, off-site personnel in the event of a well alarm or shut-in. The off-site operator shall be able to remotely access the operating system to verify well conditions and alarm status.
2. Response to alarms and automatic shut-ins: Alarm conditions related to permit compliance conditions of the well under Part II (B) (5) shall be investigated on-site by a trained operator within one (1) hour of pager notification of the occurrence.
3. Loss of power to the computer: In the event of a power failure beyond the capability of the back-up power supply shuts down the computer, the well shall be automatically shut-in.
4. Loss of dial tone: If the automatic pager cannot get a dial tone for 15 minutes, the well shall automatically be shut-in.
5. Restart of the well after an automatic shut-in: Restart of the well after an automatic shut-in related to a permit condition alarm (including, but not limited to, injection pressure, annulus differential pressure, loss of dial tone for more than 15 minutes or computer power failure) shall require the physical presence of the operator on-site before the well can be restarted.
6. Restart of the well after non-permit condition related or scheduled shut-ins: If the well is shut-in for more than 48 hours for circumstances unrelated to permit conditions, restart of the well shall require the physical presence of the operator on-site.
7. Weekly operator inspections: If fluid injection occurs during the period of any week and the well is being monitored remotely, a trained operator shall physically visit the site to inspect the facility at a minimum frequency of not less than once per week. This inspection shall verify the correct operation of the remote monitoring system by review of items such as, but not limited to, a comparison of the values shown on mechanical gauges with those reported by the remote operating system.
8. When not in use by a trained well operator, offloading connections shall be locked at the valves leading to waste water tanks so that access is restricted to trained well operators.
9. Offloading of waste from offsite sources can only occur with a trained operator physically present on site. An offsite waste related bound log book will be maintained documenting that a trained well operator allowed offsite waste to be unloaded. At a minimum, offsite waste log book entries are to include operator name, date, time, generator identification, approximate volume, and approved waste source identification number from the effective permit. The bound offsite waste log book(s) will be considered part of the plant monitoring records regarding the injection wells.